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(54) Title: EXTRACTION PROCESS FOR REACTIVE METAL OXIDES

(57) Abstract: The present invention relates to a zero-waste process for extraction of alumina from different types of bauxite ores and red mud residues and of titanium dioxide from ilmenite. Iron oxide is first reduced to metallic iron above the melting point of C-saturated cast iron alloy which yields a high-C iron alloy and an Al and Ti metal oxide rich slag which is then treated with alkali carbonate to form alkali aluminates and titanates. The alkali aluminates are separated by water leaching from which the hydroxide of alumina is precipitated by bubbling CO₂. The residue from water leaching is treated with sulphuric acid and TiO₂ is precipitated via a hydrolysis route. The process recovers most of the metal values and generates only small quantities of silicious residues at pH 4-5 which can be used for soil conditioning. The present also relates to a method for selective separation of TiO₂-rich oxides from titaniferous ore/residue materials via oxidative roasting in the presence of alkali carbonate or carbonates followed by aqueous leaching of the roasted material and selective precipitation of TiO₂ under controlled condition below pH=4.



WO 2004/113230 A1